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AIR MONITORING PROGRAM REPORT
LIVINGSTON RAIL YARD
LIVINGSTON, MONTANA

Prepared for:

Burlington Northern Railroad Co.
9401 Indian Creek Parkway
Overland Park, Kansas 66201

Prepared by:
Envirocon, Inc.
101 International Way
Missoula, Montana 59802

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ENVIROCON, INC.

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1.0 INTRODUCTION

Burlington Northern Railroad (BNRR), represented by its contractor, Envirocon, Inc. (Envirocon), continued air monitoring in conjunction with work activities at the Livingston rail yard. The air monitoring program is being conducted according to Section 9.7 of the Interim Remedial Measures Work Plan (IRMWP), as amended. The following report summarizes the air monitoring program results to date.

2.0 ANALYTICAL RESULTS

2.1 Real-Time Air Monitoring

Real-time air monitoring results using the photoionization detector (PIDs) have not exceeded the site-specific action level of 9 units requiring Level C personal protection. Generally, the only readings above 0.0 units have occurred while placing the PIDs in worst-case areas, such as the cuttings hopper or excavator bucket containing contaminated material. During the installation of wells and test excavations, low levels of ionizable organics were detected. The highest sustained (more than 15 seconds) readings from breathing zones were 2.2 during the installation of Well 89-9 and 6.1 during the excavation of Test Pit No. 40.

The quantitative air monitoring (NIOSH methods) results detailed below confirm that levels of organics within and emanating from work zones have been below levels of concern.

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2.2 NIOSH Monitoring Events

The following is a list of sampling events conducted to date since the last air monitoring report (Envirocon, Feb. 23, 1990) using NIOSH methodology. The location, activity, and weather conditions are listed.

January 21, 1990

Location: Locomotive Engine Repair Shop
Activity: Installation of Well 89-3
Weather: Not recorded, inside building

January 31, 1990

Location: Waste water treatment plant sump work zone
Activity: Pump sludge from sump to temporary holding pit
Weather: Clear, cold (10-18 F), winds from NE at 5-10 mph.

February 2, 1990

Location: Test Cell No. 2
Activity: Installation of HRO-7
Weather: Clear, cold (16 F), winds at 5-7 mph

February 9, 1990

Locations: Wells LS-11, L-87-1, and L-87-2
Activity: Background sampling
Weather: Overcast, cool (40 F), winds from SW at 15 mph with gusts

February 12, 1990

Location: Waste water treatment plant sludge sump
Activity: Pump sludge from temporary holding pit to containment pit
Weather: Snowing, cold (26 F), winds from NW at 10 mph (with gusts) shifting to SW in late afternoon

March 4, 1990

Location: Locomotive Engine Repair Shop
Activity: Installation of Well 89-9
Weather: Overcast with intermittent showers, cool (45-50 F)

2.2.1 NIOSH Analytical Results

The analytical results for the above listed air monitoring events are found in Appendix A. The following table is the list of samples in which polynuclear aromatic hydrocarbons (PNAs), volatile organic analytes (VOAs), or particulates were detected, along with relevant information.

Date	Lab ID#	Sample Type	Sample Location	Well	Compound(s) Detected
01/21/90	798592	Part	WZ		ND
01/21/90	798592	PNA	WZ		ND
01/21/90	798594	VOA	WZ		ND
01/31/90	803406	Part	DW		ND
01/31/90	803407	Part	UW		ND
01/31/90	803417	PNA	UW		ND
01/31/90	803429	VOA	UW		ND
01/31/90	803416	PNA	DW		Naphthalene 0.4 (ug)/ 0.7 (ug/m3)
01/31/90	803428	VOA	DW		Dichloroethylenes 0.003 (mg)/ 0.008(ppm)
02/02/90	803431	VOA	DW		ND
02/02/90	803408	Part	DW		NA
02/02/90	803409	Part	UW		NA

Date	Lab ID#	Sample Type	Sample Location	Well	Compound(s) Detected
02/02/90	803432	VOA	UW		ND
02/02/90	803419	PNA	DW		Naphthalene 0.2 (ug)/ 0.4 (ug/m3)
02/02/90	803420	PNA	UW		Naphthalene 0.5 (ug)/ 0.9 (ug/m3)
02/09/90	803410	Part	BG	(LS-11)	Particulate 0.2 (mg)/ 0.5 (mg/m3)
02/09/90	803433	VOA	BG	(LS-11)	ND
02/09/90	803421	PNA	BG	(LS-11)	ND
02/09/90	803434	VOA	BG	(L87-1)	ND
02/09/90	803411	Part	BG	(L87-1)	ND
02/09/90	803422	PNA	BG	(l87-1)	ND
02/09/90	804435	VOA	BG	(L87-1)	ND
02/09/90	803412	Part	BG	(L87-2)	ND
02/02/90	803423	PNA	BG	(L87-2)	ND
02/12/90	803425	PNA	DW		Naphthalene 0.3 (ug)/ 0.6 (ug/m3)
02/12/90	803438	VOA	P		Tetrachloroethylene 0.006 (mg)/ 0.05 (ppm) Dichloroethylenes 0.068 (mg)/ 0.89 (ppm) Chlorotoluene 0.039 (mg)/ 0.39 (ppm)
02/12/90	803414	Part	DW		ND
02/12/90	803415	Part	UW		ND
02/12/90	803426	PNA	UW		ND

Date	Lab ID#	Sample Type	Sample Location	Well	Compound(s) Detected
02/12/90	803437	VOA	DW		ND
03/04/90	807577	Part	WZ		Particulates 1.0 (mg)/ 2.1 (mg/m3)
03/04/90	807577	PNA	WZ		Naphthalene 2.6 (ug)/ $\leq$5.7 (ug/m3) Fluorene 0.09 (ug)/$\leq$0.21(ug/m3) Phenanthrene 0.32 (ug)/ 0.67(ug/m3)
03/04/90	807574	VOA	WZ		ND

Sample Locations: UW - upwind, DW - downwind, P - personal, BG - background, WZ - work zone

Compounds Detected: ND - none detected, NA - not analyzed

2.2.2 Discussion of Results

2.2.2.1 Work Zone Sampling

During the January 31, 1990 sampling event inside the Locomotive Engine Repair Shop, no particulates were detected. Naphthalene and dichloroethylenes were detected at levels of 0.7 ug/m3 and 0.008 ppm, respectively. These levels are considerably less than the Permissible Exposure Limits (PEL) of 50 mg/m3 for naphthalene and 200 ppm for 1,2-dichloroethylene established by OSHA in 29 CFR 1910, Subpart Z. Due to the lack of knowledge about conditions beneath the shop, personnel were in Level C personal protection throughout drilling operations at this site.

Sampling on February 2, 1990 during the installation of HRO-7 at Test Cell No. 2 detected naphthalene. The upwind concentration of naphthalene was 0.9 ug/m3. The downwind sample contained a lower concentration of 0.4 ug/m3. This sampling site is between the main east-west thoroughfare (Park St.) and (adjacent to) the main rail line. Engine exhaust and a smudge pot heater are suspected to have contributed to these results, based upon observed real-time (PID) monitoring.

During the pumping of sludge at the waste water treatment plant on February 12, 1990, naphthalene was detected in the downwind sample at a concentration of 0.6 ug/m3. Tetrachloroethylene (0.05 ppm), dichloroethylenes (0.89 ppm), and chlorotoluene (0.39 ppm) were detected in a personal sample. The PEL for tetrachloroethylene is 100 ppm. No PEL has been established for total dichloroethylenes; however, 1,2-dichloroethylene has a PEL of 200 ppm. Chlorotoluene has been assigned a NIOSH Time-Weighted Average (TWA) exposure limit of 50 ppm, though, as in the case of total dichloroethylenes, no PEL has been established. The individual was in Level C protection during work activities in the sludge pit during the sampling period. Mixing and dilution of the airborne contaminates are most probably responsible for the difference in the observed perimeter and personal sample levels.

During the March 4, 1990 sampling event inside the Locomotive Engine Repair Shop, particulates were measured in the work zone at 2.1 mg/m3. The PNA counpounds of naphthalene, fluorene, and phenanthrene were also detected in the work zone. Naphthalene was present at a total concentration of 2.6 ug (less than 5.7 ug/m3). Fluorene was measured at a total concentration of 0.09 ug (less than 0.21 ug/m3). Phenanthrene was detected at a concentration of 0.67 ug/m3. Neither fluorene nor phenanthrene have been assigned PEL nor TWA values. As stated above, the PEL for naphthalene is 50 mg/m3. As in the drilling activities on January 31, 1990,

personnel were required to wear Level C personal protection at the discretion of the work zone supervisor.

2.2.2.2 Background Sampling

Background samples were collected using NIOSH methods on February 9, 1990 as outlined in section 9.7.1 of the IRMWP, as amended. No site investigation/remediation activities took place on this date. Background samples were collected at Wells LS-11, L-87-1, and L-87-2. These sites are roughly in line across the center of the rail yard in an east-west configuration.

Particulates were detected at Well LS-11 during the background sampling. Background particulates were measured at 0.5 mg/m3. This indicates that measurable airborne particulates are present across the site due to circumstances unrelated to investigation or remediation activities.

2.2.2.3 Comparison of Real-Time and NIOSH Sampling

Laboratory analysis of samples collected during activities in which both NIOSH and real-time sampling were conducted indicate that real-time monitoring is capable of detecting contaminates prior to unacceptable exposure of site personnel. During the installation of Well 89-9, 16 PID readings collected from the breathing zone averaged to 0.74 ppm (isobutylene equivalents). Analysis of NIOSH samples collected over the same period detected the presence of specific PNAs at levels above detection limits but considerably below established exposure limits.

3.0 SUMMARY

Air sampling results to date, using both real-time (PID) and quantitative (NIOSH) methods, indicate that the investigative and interim remedial activities are not causing emissions of VOAs, PNAs, or total dusts in concentrations of concern. In addition, the air sampling results indicate that Level D personal protection within the work zones has been adequate and appropriate.

Air monitoring will continue using both PIDs and NIOSH methodology. NIOSH air sampling will be conducted when new activities or new work sites are initiated in which it is determined that the potential for emissions in concentrations of concern exists.

APPENDIX A
ANALYTICAL RESULTS

Analytical Results
for
ENVIROCON INCORPORATED

Clayton Project No. 64165-17

Sample Matrix/Media:	Charcoal Tube	Date Received:	03/06/90
Lab Number:	807574 (F8349 & F8350)	Date Analyzed:	03/16/90
		Air Volume (Liters):	65.95
Sample Identification:	140101-AA-066		
Analytical Method:	GC/MS		

Tentatively Identified Compounds	Estimated Concentration Front (ug)	Back (ug)	Total (ug)	Total (ug/m3)
Limonene	<4	7	7	100

Approximate limit of detection: 4 ug.

Analytical Results
for
ENVIROCON INCORPORATED

Clayton Project No. 64165-17

Sample Matrix/Media:	Charcoal Tube	Date Received:	03/06/90
Lab Number:	807575 (F8351 & F8352)	Date Analyzed:	03/17/90
		Air Volume (Liters):	----
Sample Idenitfication:	140101-AA-069		
Analytical Method:	GC/MS		

Tentatively Identified Compounds	Estimated Concentration (ug)	Estimated Concentration (ug/m3)
No compounds detected	---	---

Approximate limit of detection: 4 ug.

Back section was analyzed with no significant breakthrough detected.

Analytical Laboratory Report
for
ENVIROCON, INCORPORATED

Clayton Project No. 64165-17

Lab Number: 807576
Sample Description: 140101-AA-070

Compound	(ug)	Limit of Detection (ug)
Naphthalene	<0.1	0.1
Acenaphthylene	<0.1	0.1
Acenapthene	<0.3	0.3
Fluorene	<0.01	0.01
Phenanthrene	<0.01	0.01
Anthracene	<0.01	0.01
Fluoranthene	<0.01	0.01
Pyrene	<0.01	0.01
Benzo(a)anthracene	<0.01	0.01
Chrysene	<0.01	0.01
Benzo(b)fluoranthene	<0.02	0.02
Benzo(k)fluoranthene	<0.01	0.01
Benzo(a)pyrene	<0.01	0.01
Dibenzo(a,h)anthracene	<0.01	0.01
Benzo(g,h,i)perylene	<0.01	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	0.01

Analytical Method (NIOSH): 5506

Lab Number	Sample Description	Air Volume (Liters)	Particulate (mg)	(mg/m3)
807577	140101-AA-067,068	476.25	1.0	2.1

Limit of Detection: 0.1 mg
Analytical Method (NIOSH): 0500

The result has been blank corrected using a lab blank. Please note that a blank should be submitted with each sample set.

CLAYTON ENVIRONMENTAL CONSULTANTS, INC.

Analytical Laboratory Report
for
ENVIROCON, INCORPORATED

Clayton Project No. 64165-17

Lab Number: 807577
Sample Description: 140101-AA-068
Air Volume (Liters): 476.25

Compound		-067 Filter (ug)	-068 Tube (ug)	Total (ug)	Total (ug/m3)	Limit of Detection (ug)
Naphthalene	Front	--	2.1	--	--	--
	Back	--	0.5	--	--	--
	Total	<0.1	2.6	<2.7	<5.7	0.2
Acenaphthylene		<0.1	<0.1	<0.2	<0.4	0.2
Acenapthene		<0.3	<0.3	<0.6	<1	0.6
Fluorene		<0.01	0.09	<0.10	<0.21	0.02
Phenanthrene	Front	--	0.21	--	--	--
	Back	--	0.03	--	--	--
	Total	0.08	0.24	0.32	0.67	0.02
Anthracene		<0.01	<0.01	<0.02	<0.04	0.02
Fluoranthene		<0.01	<0.01	<0.02	<0.04	0.02
Pyrene		<0.01	<0.01	<0.02	<0.04	0.02
Benzo(a)anthracene		<0.01	<0.01	<0.02	<0.04	0.02
Chrysene		<0.01	<0.01	<0.02	<0.04	0.02
Benzo(b)fluoranthene		<0.02	<0.02	<0.04	<0.08	0.04
Benzo(k)fluoranthene		<0.01	<0.01	<0.02	<0.04	0.02
Benzo(a)pyrene		<0.01	<0.01	<0.02	<0.04	0.02
Dibenzo(a,h)anthracene		<0.01	<0.01	<0.02	<0.04	0.02
Benzo(g,h,i)perylene		<0.01	<0.01	<0.02	<0.04	0.02
Indeno(1,2,3,c,d)pyrene		<0.01	<0.01	<0.02	<0.04	0.02

Analytical Method (NIOSH): 5506

CLAYTON ENVIRONMENTAL CONSULTANTS, INC.
22345 Roethel Drive Novi, Michigan 48050

Mr. Crowell Herrick
Engineer
ENVIROCON, INCORPORATED
P.O. Box 1154
Livingston, MT 59047

Date Reported: 15-FEB-90
Date Received: 23-JAN-90
Clayton Project No. 63306-17

Dear Mr. Herrick:

The following is our report on the samples submitted for analysis.

Table 1

Lab Number	Sample Description	Air Volume (Liters)	Particulate	
			(mg)	(mg/m3)
798592	140101-AA-027 PTFE9-213-28(2)	154.9	<0.1	<0.6

Limit of Detection: 0.1 mg
Analytical Method (NIOSH): 0500

The result has been blank corrected using a lab blank. Please note that a blank from each filter series (middle three digits for preweighed filters) should be submitted with each sample set.

Table 2

Lab Number: 798592
Sample Description: 140101-AA-027
Air Volume (Liters): 154.9

Compound	Filter (ug)	Tube (ug)	Total (ug)	Total (ug/m3)	Limit of Detection (ug)
Naphthalene	<0.1	<0.1	<0.2	<1	0.2
Acenaphthylene	<0.1	<0.1	<0.2	<1	0.2
Acenapthene	<0.3	<0.3	<0.6	<4	0.6
Fluorene	<0.01	<0.01	<0.02	<0.1	0.02
Phenanthrene	<0.01	<0.01	<0.02	<0.1	0.02
Anthracene	<0.01	<0.01	<0.02	<0.1	0.02
Fluoranthene	<0.01	<0.01	<0.02	<0.1	0.02
Pyrene	<0.01	<0.01	<0.02	<0.1	0.02
Benzo(a)anthracene	<0.01	<0.01	<0.02	<0.1	0.02
Chrysene	<0.01	<0.01	<0.02	<0.1	0.02
Benzo(b)fluoranthene	<0.02	<0.02	<0.04	<0.3	0.04
Benzo(k)fluoranthene	<0.01	<0.01	<0.02	<0.1	0.02
Benzo(a)pyrene	<0.01	<0.01	<0.02	<0.1	0.02
Dibenzo(a,h)anthracene	<0.01	<0.01	<0.02	<0.1	0.02
Benzo(q,h,i)perylene	<0.01	<0.01	<0.02	<0.1	0.02
Indeno(1,2,3,c,d)pyrene	<0.01	<0.01	<0.02	<0.1	0.02

Analytical Method (NIOSH): 5506

Table 3

Lab Number: 798593
Sample Description: 140101-AA-028

Compound	(ug)	Limit of Detection (ug)
Naphthalene	<0.1	0.1
Acenaphthylene	<0.1	0.1
Acenapthene	<0.3	0.3
Fluorene	<0.01	0.01
Phenanthrene	<0.01	0.01
Anthracene	<0.01	0.01
Fluoranthene	<0.01	0.01
Pyrene	<0.01	0.01
Benzo(a)anthracene	<0.01	0.01
Chrysene	<0.01	0.01
Benzo(b)fluoranthene	<0.02	0.02
Benzo(k)fluoranthene	<0.01	0.01
Benzo(a)pyrene	<0.01	0.01
Dibenzo(a,h)anthracene	<0.01	0.01
Benzo(q,h,i)perylene	<0.01	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	0.01

Analytical Method (NIOSH): 5506

Table 4

Lab Number: 798594
Sample Description: 140101-AA-026
Air Volume (Liters): 34.7

Analyte	(mg)	(ppm)	Limit of Detection (mg)	Method (NIOSH)
Tetrachloroethene	<0.004	<0.02	0.004	1003
Trichloroethylene	<0.004	<0.02	0.004	1022
1,1-Dichloroethene	<0.001	<0.007	0.001	1003
Benzene	<0.002	<0.02	0.002	1501
Chlorobenzene	<0.003	<0.02	0.003	1003
Naphthalene	<0.01	<0.05	0.01	1501
Chlorotoluene	<0.006	<0.03	0.006	*
1,2-Dichloroethene	<0.003	<0.02	0.003	1003

* Analysis performed by gas chromatography using a flame ionization detector (GC/FID).

Results have been corrected for desorption efficiencies where appropriate.

Back sections were checked and showed no significant breakthrough.

Table 5

Lab Number: 798595
Sample Description: 140101-AA-029

Analyte	(mg)	Limit of Detection (mg)	Method (NIOSH)
Tetrachloroethene	<0.004	0.004	1003
Trichloroethylene	<0.004	0.004	1022
1,1-Dichloroethene	<0.001	0.001	1003
Benzene	<0.002	0.002	1501
Chlorobenzene	<0.003	0.003	1003
Naphthalene	<0.01	0.01	1501
Chlorotoluene	<0.006	0.006	*
1,2-Dichloroethene	<0.003	0.003	1003

* Analysis performed by gas chromatography using a flame ionization detector (GC/FID).

Results have been corrected for desorption efficiencies where appropriate.

Back sections were checked and showed no significant breakthrough.

We appreciate the opportunity to be of assistance to you. Please call our Client Services Department at (313) 344-2650 or me if you have any questions.

Robert Lieckfield Jr., C.I.H.
Manager, Laboratory Services

CLAYTON ENVIRONMENTAL CONSULTANTS, INC.
22345 Roethel Drive Novi, Michigan 48050

Mr. Randall H. NeSmith
ENVIROCON, INC.
P.O. Box 1154
Livingston, MT 59047

Date Reported: 9-MAR-90
Date Received: 14-FEB-90
Clayton Project No.: 63752-17

Dear Mr. NeSmith:

The following is our report on the samples submitted for analysis.

Table 1

Lab Number	Sample Description	Air Volume (Liters)	Particulate (mg)	Particulate (mg/m3)
803406	140101-AA-030 PTFE9-213-27	566.909	<0.1	<0.2
803407	140101-AA-033 PTFE9-213-29	600.834	<0.1	<0.2
803408	140101-AA-038 PTFE2-333	510	*	--
803409	140101-AA-041 PTFE2-311	567	*	--
803410	140101-AA-045 PTFE9-221-35	426	0.2	0.5
803411	140101-AA-048 PTFE9-221-33	381.25	<0.1	<0.3
803412	140101-AA-051 PTFE9-221-24	300	<0.1	<0.3
803413	140101-AA-054 PTFE9-221-40 BLANK	--	<0.1	--
803414	140101-AA-056 PTFE9-221-25	517.50	<0.1	<0.2
803415	140101-AA-058 PTFE9-221-29	503.20	<0.1	<0.2

Limit of Detection: 0.1 mg
Analytical Method (NIOSH): 0500

* Sample was not a tared filter; unable to analyze.

The results have been blank corrected.

Table 2

Lab Number: 803416
Sample Description: 140101-AA-031
Air Volume (Liters): 566.909

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	0.4	0.7	0.1
Acenaphthylene	<0.1	<0.2	0.1
Acenapthene	<0.3	<0.5	0.3
Fluorene	<0.01	<0.02	0.01
Phenanthrene	<0.01	<0.02	0.01
Anthracene	<0.01	<0.02	0.01
Fluoranthene	<0.01	<0.02	0.01
Pyrene	<0.01	<0.02	0.01
Benzo(a)anthracene	<0.01	<0.02	0.01
Chrysene	<0.01	<0.02	0.01
Benzo(b)fluoranthene	<0.02	<0.04	0.02
Benzo(k)fluoranthene	<0.01	<0.02	0.01
Benzo(a)pyrene	<0.01	<0.02	0.01
Dibenzo(a,h)anthracene	<0.01	<0.02	0.01
Benzo(g,h,i)perylene	<0.01	<0.02	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.02	0.01

Analytical Method: NIOSH 5506

Table 3

Lab Number: 803417
Sample Description: 140101-AA-034
Air Volume (Liters): 600.834

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	<0.1	<0.2	0.1
Acenaphthylene	<0.1	<0.2	0.1
Acenapthene	<0.3	<0.5	0.3
Fluorene	<0.01	<0.02	0.01
Phenanthrene	<0.01	<0.02	0.01
Anthracene	<0.01	<0.02	0.01
Fluoranthene	<0.01	<0.02	0.01
Pyrene	<0.01	<0.02	0.01
Benzo(a)anthracene	<0.01	<0.02	0.01
Chrysene	<0.01	<0.02	0.01
Benzo(b)fluoranthene	<0.02	<0.03	0.02
Benzo(k)fluoranthene	<0.01	<0.02	0.01
Benzo(a)pyrene	<0.01	<0.02	0.01
Dibenzo(a,h)anthracene	<0.01	<0.02	0.01
Benzo(g,h,i)perylene	<0.01	<0.02	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.02	0.01

Analytical Method: NIOSH 5506

Table 4

Lab Number: 803418
Sample Description: 140101-AA-036 BLANK

Compound	(ug)	Limit of Detection (ug)
Naphthalene	<0.1	0.1
Acenaphthylene	<0.1	0.1
Acenapthene	<0.3	0.3
Fluorene	<0.01	0.01
Phenanthrene	<0.01	0.01
Anthracene	<0.01	0.01
Fluoranthene	<0.01	0.01
Pyrene	<0.01	0.01
Benzo(a)anthracene	<0.01	0.01
Chrysene	<0.01	0.01
Benzo(b)fluoranthene	<0.02	0.02
Benzo(k)fluoranthene	<0.01	0.01
Benzo(a)pyrene	<0.01	0.01
Dibenzo(a,h)anthracene	<0.01	0.01
Benzo(g,h,i)perylene	<0.01	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	0.01

Analytical Method: NIOSH 5506

Table 6

Lab Number: 803420
Sample Description: 140101-AA-042
Air Volume (Liters): 567

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	0.5	0.9	0.1
Acenaphthylene	<0.1	<0.2	0.1
Acenapthene	<0.3	<0.5	0.3
Fluorene	<0.01	<0.02	0.01
Phenanthrene	<0.01	<0.02	0.01
Anthracene	<0.01	<0.02	0.01
Fluoranthene	<0.01	<0.02	0.01
Pyrene	<0.01	<0.02	0.01
Benzo(a)anthracene	<0.01	<0.02	0.01
Chrysene	<0.01	<0.02	0.01
Benzo(b)fluoranthene	<0.02	<0.04	0.02
Benzo(k)fluoranthene	<0.01	<0.02	0.01
Benzo(a)pyrene	<0.01	<0.02	0.01
Dibenzo(a,h)anthracene	<0.01	<0.02	0.01
Benzo(g,h,i)perylene	<0.01	<0.02	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.02	0.01

Analytical Method: NIOSH 5506

Table 7

Lab Number: 803421
Sample Description: 140101-AA-046
Air Volume (Liters): 426

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	<0.1	<0.2	0.1
Acenaphthylene	<0.1	<0.2	0.1
Acenapthene	<0.3	<0.7	0.3
Fluorene	<0.01	<0.02	0.01
Phenanthrene	<0.01	<0.02	0.01
Anthracene	<0.01	<0.02	0.01
Fluoranthene	<0.01	<0.02	0.01
Pyrene	<0.01	<0.02	0.01
Benzo(a)anthracene	<0.01	<0.02	0.01
Chrysene	<0.01	<0.02	0.01
Benzo(b)fluoranthene	<0.02	<0.05	0.02
Benzo(k)fluoranthene	<0.01	<0.02	0.01
Benzo(a)pyrene	<0.01	<0.02	0.01
Dibenzo(a,h)anthracene	<0.01	<0.02	0.01
Benzo(g,h,i)perylene	<0.01	<0.02	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.02	0.01

Analytical Method: NIOSH 5506

Table 8

Lab Number: 803422
Sample Description: 140101-AA-049
Air Volume (Liters): 381.25

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	<0.1	<0.3	0.1
Acenaphthylene	<0.1	<0.3	0.1
Acenapthene	<0.3	<0.8	0.3
Fluorene	<0.01	<0.03	0.01
Phenanthrene	<0.01	<0.03	0.01
Anthracene	<0.01	<0.03	0.01
Fluoranthene	<0.01	<0.03	0.01
Pyrene	<0.01	<0.03	0.01
Benzo(a)anthracene	<0.01	<0.03	0.01
Chrysene	<0.01	<0.03	0.01
Benzo(b)fluoranthene	<0.02	<0.05	0.02
Benzo(k)fluoranthene	<0.01	<0.03	0.01
Benzo(a)pyrene	<0.01	<0.03	0.01
Dibenzo(a,h)anthracene	<0.01	<0.03	0.01
Benzo(g,h,i)perylene	<0.01	<0.03	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.03	0.01

Analytical Method: NIOSH 5506

Table 9

Lab Number: 803423
Sample Description: 140101-AA-052
Air Volume (Liters): 300

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	<0.1	<0.3	0.1
Acenaphthylene	<0.1	<0.3	0.1
Acenapthene	<0.3	<1.0	0.3
Fluorene	<0.01	<0.03	0.01
Phenanthrene	<0.01	<0.03	0.01
Anthracene	<0.01	<0.03	0.01
Fluoranthene	<0.01	<0.03	0.01
Pyrene	<0.01	<0.03	0.01
Benzo(a)anthracene	<0.01	<0.03	0.01
Chrysene	<0.01	<0.03	0.01
Benzo(b)fluoranthene	<0.02	<0.07	0.02
Benzo(k)fluoranthene	<0.01	<0.03	0.01
Benzo(a)pyrene	<0.01	<0.03	0.01
Dibenzo(a,h)anthracene	<0.01	<0.03	0.01
Benzo(g,h,i)perylene	<0.01	<0.03	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.03	0.01

Analytical Method: NIOSH 5506

Table 10

Lab Number: 803424
Sample Description: 140101-AA-053 BLANK

Compound	(ug)	Limit of Detection (ug)
Naphthalene	<0.1	0.1
Acenaphthylene	<0.1	0.1
Acenapthene	<0.3	0.3
Fluorene	<0.01	0.01
Phenanthrene	<0.01	0.01
Anthracene	<0.01	0.01
Fluoranthene	<0.01	0.01
Pyrene	<0.01	0.01
Benzo(a)anthracene	<0.01	0.01
Chrysene	<0.01	0.01
Benzo(b)fluoranthene	<0.02	0.02
Benzo(k)fluoranthene	<0.01	0.01
Benzo(a)pyrene	<0.01	0.01
Dibenzo(a,h)anthracene	<0.01	0.01
Benzo(g,h,i)perylene	<0.01	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	0.01

Analytical Method: NIOSH 5506

Table 11

Lab Number: 803425
Sample Description: 140101-AA-057
Air Volume (Liters): 517.50

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	0.3	0.6	0.1
Acenaphthylene	<0.1	<0.2	0.1
Acenapthene	<0.3	<0.6	0.3
Fluorene	<0.01	<0.02	0.01
Phenanthrene	<0.01	<0.02	0.01
Anthracene	<0.01	<0.02	0.01
Fluoranthene	<0.01	<0.02	0.01
Pyrene	<0.01	<0.02	0.01
Benzo(a)anthracene	<0.01	<0.02	0.01
Chrysene	<0.01	<0.02	0.01
Benzo(b)fluoranthene	<0.02	<0.04	0.02
Benzo(k)fluoranthene	<0.01	<0.02	0.01
Benzo(a)pyrene	<0.01	<0.02	0.01
Dibenzo(a,h)anthracene	<0.01	<0.02	0.01
Benzo(g,h,i)perylene	<0.01	<0.02	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.02	0.01

Analytical Method: NIOSH 5506

Table 12

Lab Number: 803426
Sample Description: 140101-AA-059
Air Volume (Liters): 503.20

Compound	(ug)	(ug/m3)	Limit of Detection (ug)
Naphthalene	<0.1	<0.2	0.1
Acenaphthylene	<0.1	<0.2	0.1
Acenapthene	<0.3	<0.6	0.3
Fluorene	<0.01	<0.02	0.01
Phenanthrene	<0.01	<0.02	0.01
Anthracene	<0.01	<0.02	0.01
Fluoranthene	<0.01	<0.02	0.01
Pyrene	<0.01	<0.02	0.01
Benzo(a)anthracene	<0.01	<0.02	0.01
Chrysene	<0.01	<0.02	0.01
Benzo(b)fluoranthene	<0.02	<0.04	0.02
Benzo(k)fluoranthene	<0.01	<0.02	0.01
Benzo(a)pyrene	<0.01	<0.02	0.01
Dibenzo(a,h)anthracene	<0.01	<0.02	0.01
Benzo(g,h,i)perylene	<0.01	<0.02	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	<0.02	0.01

Analytical Method: NIOSH 5506

Table 13

Lab Number: 803427
Sample Description: 140101-AA-063 BLANK

Compound	(ug)	Limit of Detection (ug)
Naphthalene	<0.1	0.1
Acenaphthylene	<0.1	0.1
Acenapthene	<0.3	0.3
Fluorene	<0.01	0.01
Phenanthrene	<0.01	0.01
Anthracene	<0.01	0.01
Fluoranthene	<0.01	0.01
Pyrene	<0.01	0.01
Benzo(a)anthracene	<0.01	0.01
Chrysene	<0.01	0.01
Benzo(b)fluoranthene	<0.02	0.02
Benzo(k)fluoranthene	<0.01	0.01
Benzo(a)pyrene	<0.01	0.01
Dibenzo(a,h)anthracene	<0.01	0.01
Benzo(g,h,i)perylene	<0.01	0.01
Indeno(1,2,3,c,d)pyrene	<0.01	0.01

Analytical Method: NIOSH 5506

Table 14

Lab Number	Sample Description	Air Volume (Liters)	Tetrachloro-ethylene (mg)	Tetrachloro-ethylene (ppm)	Trichloro-ethylene (mg)	Trichloro-ethylene (ppm)	Benzene (mg)	Benzene (ppm)
803428	140101-AA-032	99.248	<0.004	<0.006	<0.004	<0.007	<0.002	<0.006
803429	140101-AA-035	90.082	<0.004	<0.007	<0.004	<0.008	<0.002	<0.007
803430	140101-AA-037 BLANK	--	<0.004	--	<0.004	--	<0.002	--
803431	140101-AA-040	79.4	<0.004	<0.007	<0.004	<0.009	<0.002	<0.008
803432	140101-AA-043	88.2	<0.004	<0.007	<0.004	<0.008	<0.002	<0.007
803433	140101-AA-044	60	<0.004	<0.01	<0.004	<0.01	<0.002	<0.01
803434	140101-AA-047	54.9	<0.004	<0.01	<0.004	<0.01	<0.002	<0.01
803435	140101-AA-050	40.8	<0.004	<0.01	<0.004	<0.02	<0.002	<0.02
803436	140101-AA-055 BLANK	--	<0.004	--	<0.004	--	<0.002	--
803437	140101-AA-060	67.50	<0.004	<0.009	<0.004	<0.01	<0.002	<0.009
803438	140101-AA-061	19.21	0.006	0.05	<0.004	<0.04	<0.002	<0.03
803439	140101-AA-062 BLANK	--	<0.004	--	<0.004	--	<0.002	--
	Limit of Detection:		0.004 mg		0.004 mg		0.002 mg	
	Analytical Method (NIOSH):		1003		1003		1501	

Back sections were checked and showed no significant breakthrough.

Table 15

Lab Number	Sample Description	Air Volume (Liters)	Chlorobenzene (mg)	Chlorobenzene (ppm)	Naphthalene (mg)	Naphthalene (ppm)
803428	140101-AA-032	99.248	<0.003	<0.007	<0.01	<0.02
803429	140101-AA-035	90.082	<0.003	<0.007	<0.01	<0.02
803430	140101-AA-037	--	<0.003	--	<0.01	--
803431	140101-AA-040	79.4	<0.003	<0.008	<0.01	<0.02
803432	140101-AA-043	88.2	<0.003	<0.007	<0.01	<0.02
803433	140101-AA-044	60	<0.003	<0.01	<0.01	<0.03
803434	140101-AA-047	54.9	<0.003	<0.01	<0.01	<0.03
803435	140101-AA-050	40.8	<0.003	<0.02	<0.01	<0.05
803436	140101-AA-055	--	<0.003	--	<0.01	--
803437	140101-AA-060	67.5	<0.003	<0.01	<0.01	<0.03
803438	140101-AA-061	19.21	<0.003	<0.03	<0.01	<0.1
803439	140101-AA-062	--	<0.003	--	<0.01	--
Limit of Detection:			0.003 mg		0.01 mg	
Analytical Method (NIOSH):			1501		1501	

The results for naphthalene have been corrected for a desorption efficiency of 39%.

Back sections were checked and showed no significant breakthrough.

Table 16

Lab Number	Sample Description	Air Volume (Liters)	Total Dichloroethylenes (mg)	Total Dichloroethylenes (ppm)	Chlorotoluene (mg)	Chlorotoluene (ppm)
803428	140101-AA-032	99.248	0.003	0.008	<0.006	<0.01
803429	140101-AA-035	90.082	<0.003	<0.008	<0.006	<0.01
803430	140101-AA-037	--	<0.003	--	<0.006	--
803431	140101-AA-040	79.4	<0.003	<0.01	<0.006	<0.01
803432	140101-AA-043	88.2	<0.003	<0.009	<0.006	<0.01
803433	140101-AA-044	60	<0.003	<0.01	<0.006	<0.02
803434	140101-AA-047	54.9	<0.003	<0.01	<0.006	<0.02
803435	140101-AA-050	40.8	<0.003	<0.02	<0.006	<0.03
803436	140101-AA-055	--	<0.003	--	<0.006	--
803437	140101-AA-060	67.5	<0.003	<0.01	<0.006	<0.02
803438	140101-AA-061	19.21	0.068	0.89	0.039	0.39
803439	140101-AA-062	--	<0.003	--	<0.006	--
Limit of Detection:			0.003 mg		0.006 mg	
Analytical Method (NIOSH):			1003		1501	

The results for chlorotoluene have been corrected for a desorption efficiency of 94%.

Back sections were checked and showed no significant breakthrough.

We appreciate the opportunity to be of assistance to you. Please call our Client Services Department at (313) 344-2650 or me if you have any questions.

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